

On the superposition of Forbush ...

S/169/62/000/004/079/103
D218/D302

agreement with the value obtained from an analysis of the profile of the Forbush effect. [Abstractor's note: Complete translation].

Card 2/2

3,2410 (2205, 2805)
3,1800

37298

S/169/62/000/004/083/103
D218/D302

AUTHORS: Kaminer, N.S., Blokh, Ya.L., and Dorman, L.I.

TITLE: The cosmic-ray flare of May 4, 1960

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 4, 1962, 15, abstract 4682 (V sb. Kosmicheskiye luchy, no. 4, M., AN SSSR, 1961, 146-167)

TEXT: The world station network data are used to investigate the increase in the cosmic-ray intensity on May 4, 1960. A chromospheric flare of importance 3 was observed on the western limb of the sun at 10 hr. 5 min. It was accompanied by a series of radio bursts on 92.209 and 600 Mc/sec. By acting on the ionosphere, the ultraviolet emission from the flare gave rise to a reduction in the critical frequency of the F2 layer and the appearance of a bay-like disturbance in the H-component of the geomagnetic field. After 15 to 20 minutes, there was a rapid increase in the cosmic-ray intensity. It follows from the analysis of the data that in the initial stage of the increase in the intensity, the additional radiation was anisotropic. The method of coupling coefficients is used to calculate Card 1/2

The cosmic-ray flare of ...

S/169/62/000/004/083/103
D218/D302

the distribution of intensity over the earth's surface. The real spectrum of the additional radiation and the finite extent of its source are taken into account. Comparison with experimental data shows that on the first approximation the intensity distribution corresponds to the position of the shock zones. However, better agreement between experimental and theoretical results is obtained if it is assumed that the shock zones are considerably wider, or that they are displaced by 30 to 40° to the East. The possible reasons for this displacement are discussed. The energy spectrum of the emission of the flare and the time variation in the intensity are determined. The dimensions and the intensity of the magnetic field of scattering irregularities in the interplanetary medium are estimated. 32 references. [Abstractor's note: Complete translation].

Card 2/2

BLOKH, Ya.L.; INOZEMTSEVA, O.I.; KAMINER, N.S.; KOPYLOV, Yu.M.;
KOYAVA, V.K.; SERGEYEV, A.V.

Variations in the intensity of cosmic rays recorded Nov. 12-15,
1960. Geomag. i aer. 1 no.3:441 My-Je '61. (MIRA 14:9)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya
radiovoln AN SSSR, Institut zemnogo magnetizma, ionosfery i
rasprostraneniya radiovoln Sibirskogo otdeleniya AN SSSR i
Institut geofiziki AN GruzSSR.
(Cosmic rays)

S/203/61/001/006/009/021
D055/D113

3.2410

AUTHORS: Blokh, Ya. L., and Kaminer, N.S.

TITLE: On the variability of the coefficients of coupling between primary and secondary components of cosmic rays

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 6, 1961, 917-920

TEXT: This article shows the importance of determining the coefficients of coupling between primary and secondary components of cosmic rays, the coefficients to correspond to the period of time covered by the data being analyzed. It is shown that data from the continuous registration of variations in cosmic-ray intensity over a world-wide network of stations may be used to determine coupling coefficients relating to an arbitrary moment of time. It is best to begin this by finding a single reliable curve of the latitude effect from the results of a series of measurements of the latitudinal course of intensity of the i-type component. This curve will allow the form of the primary energy spectrum to be shown at a given moment of time; and the features of the latitude effect in other regions of the globe to be deduced. The curve will permit more accurately defining the coupling

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On the variability ...

S/203/61/001/006/009/021
D055/D113

coefficients, which can then be used together with data on cosmic-ray intensity to find the coupling coefficients for a given moment of time. There are 11 references: 6 Soviet and 5 non-Soviet. The four English-language references are: J.J. Quenby, W.R. Webber, Philos. Mag., 1959, 4, no. 37, 90; H. Elliot, R. J. Hynds, J.J. Quenby, G.J. Wenk, Proc. Moscow Cosmic Ray Conf., 1960, 4, 311; D.C. Rose, K. B. Fenton, I. Katzman, J.A. Simpson. Canad. J. Phys., 1956, 34, no. 9, 969; A.G. Fenton, K.B. Fenton, D.C. Rose. Canad. J. Phys., 1958, 36, 824. V/B

ASSOCIATION: Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR (Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation, AS USSR).

SUBMITTED: October 22, 1961

Card 2/2

BLOKH, Ya.L.

Possibility of using Geiger counters in new ways for uninterrupted recording of cosmic rays. Geomag. i aer. 2 no. 6: 1150-1152 N-D '62. (MIRA 16:1)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR.

(Geiger-Müller counters) (Cosmic rays)

BLOKH, Ya.L.

Measurement of sidereal diurnal variations in cosmic ray intensity. Geomag. i aer. 2 no.2:364-365 Mr-Apr '62. (MIRA 15:6)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR.

(Cosmic rays)

AID Nr. 974-5 22 MAY 1963
 UNDERGROUND COSMIC RAY RECORDINGS TO SOLVE GEOLOGIC PROBLEMS (USSR)

Blokh, Ya. I., V. M. Bondarenko, and A. G. Tarkhov. Geomagnetizm i aeronomiya, v. 3, no. 2, 1963, 390-392. S/203/63/003/002/025/027

A recent Soviet experiment using underground measurements of cosmic rays to detect and delineate an ore body was carried out in the Central Urals with a narrow-direction, 3-way recording counter telescope. The resolution time of the counter circuit was about 5 μ sec and the effective area of the telescope was 0.1 m². Both the counter and the electronic circuits were powered by dry-cell batteries. Unique features of the experiment were that 1) the telescope had different dimensions in 3 directions and 2) this was the first Soviet attempt with this method to distinguish between ore bodies — copper pyrite, density $\rho = 4.58$ g/cm³ — and country rocks — quartz-sericite schists ($\rho = 3.27$ g/cm³) and quartz-albite porphyries ($\rho = 2.74$ g/cm³).

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AID Nr 974-5 22 May

UNDERGROUND COSMIC RAY RECORDINGS [Cont'd]

s/203/63/003/002/025/027

The cover rock along the 600-m section was 315-350 m thick. Radiation was measured at 3 points under the ore body and at 2 in the country rock. The results demonstrated that actual rock densities compared favorably with their theoretically computed values and that underground cosmic ray measurements can be used successfully to determine rock densities, depths of observation points, and the thicknesses of overlying masses. [ER]

Card 2/2

ACCESSION NR: AT3012740

S/2961/60/000/002/0005/0057

AUTHORS: Blokh, Ya. L.; Dorman, L. I.; Kaminer, N. S.

TITLE: Individual cases of the influence of magnetic storms on cosmic rays, and their interpretation

SOURCE: AN SSSR. Mezhdunarodn. komit. po prov. mezhdunarodn. geofizich. goda. 7 razdel program. MGG. Kosmicheskiye luchy. Sb. statey, no. 2, 1960, 5-57

TOPIC TAGS: cosmic rays, cosmic ray hard component, cosmic ray neutron component, magnetic storm, sudden magnetic storm, corpuscular stream, solar corpuscular stream, cosmic ray intensity profile

ABSTRACT: An analysis is presented of the changes in intensity of the hard and neutron components of cosmic radiation occurring in about 50 different magnetic storms from 1954 through 1959 and observed in the world network of stations. The profile of each case

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ACCESSION NR: AT3012740

is classified (groups I, II, and III) and compared with the theoretically expected profile under various assumptions concerning the velocities of the corpuscular streams which carry frozen-in magnetic fields, concerning the manner whereby the earth enters the streams (sideways, leading front at different distances from the stream axes, etc.), and concerning the field structure. It is concluded that the field intensity in the leading side edge of the stream is much larger than in the remaining part of the stream. A considerable kinetic energy density dispersion is observed in the stream, decreasing on going to the trailing side edge of the stream. This explains why magnetic perturbations terminate after the resumption of the cosmic-ray intensity. The plasma in the leading part of the stream becomes highly condensed and consequently the frozen-in field intensity increases. This explains the sharp decrease in the intensity of cosmic rays during the time of some sudden magnetic storms. The following general properties are found to be common to all streams: the angular width of the stream is equal in the mean to the

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ACCESSION NR: AT3012740

angular width of the active region, the front edge of the stream is characterized by a considerable increase of the magnetic field (and corresponding compression of the plasma), and the field is somewhat more intense in the leading part of the stream compared with the field in the lagging edge. It is assumed on the basis of the analysis that during magnetic storms the cosmic ray intensity profile is determined completely by the manner in which the earth enters the stream, by the stream velocity, and by the field distribution in the stream. A detailed study of this profile can therefore yield important information on the stream properties. "In conclusion we take the opportunity to express deep gratitude to Professor Ye. L. Feynberg and to O. I. Inozemtsova for a discussion of the results. We are also grateful to the researchers who provided us with the experimental data used in the present work." Orig. art. has: 39 figures, 17 formulas, and 1 table.

ASSOCIATION: None

Cord 3/4

F. ALANIYA, O. M. BLOKH, Ye. L. BLOKH, A. M. CHETIYA, I. I. DORMAN
S. KAMINER, T. V. KEBULADZE, V. K. KOYAVA, Ye. V. KOLOMEYETS, V. O. KORIDZE,
O. FIVEREVA, M. I. TYASTO

Cosmic Ray Effects During Magnetic Storms

Report submitted for the 8th Intl. Conf. on Cosmic Rays (IUPAP), Jaipur India,
2-14 Dec 1963

ACCESSION NR: AT3012814

S/2961/63/000/005/0178/0203

AUTHORS: Abrosimov, A. T.; Blokh, Ya. L.

TITLE: Proposed installation for continuous registration of inclined extensive air showers and the common component of cosmic radiation

SOURCE: AN SSSR. Mezhdovedomst. geofizich. komitet. 7 razdel program. MGG: Kosmicheskiye luchy. Sb. statey, no. 5, 1963, 178-203

TOPIC TAGS: cosmic rays, cosmic ray measurement, luminescent counter, cosmic ray variation, cosmic ray arrival time, counter directivity pattern, cosmic ray common component, origin of cosmic rays

ABSTRACT: An array of luminescent counters is described, designed for continuous measurement and automatic registration of densities of particle fluxes and inclination angles of cosmic rays in inclined

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ACCESSION NR: AT3012814

extensive air showers. The apparatus is aimed also at eliminating many difficulties inherent in the determination of the sidereal-diurnal variations of cosmic rays. The use of scintillation counters in lieu of Geiger-Müller counters extends the possible range of measurements. Measurements of relative times of the arrival of cosmic ray particles and studies of short-period variations are proposed. The article describes the detectors and their manufacture, the counters and their calibration, the differential spectrum of the pulses from a luminescent counter, the directivity pattern of a single luminescent counter, the individual units of the array, and problems involved in combined operation of the photomultipliers and vacuum tube amplifiers, the coaxial lines, the power supply to the photomultiplier, the registration of the common cosmic-ray component, and the reliability of the apparatus. It is claimed that the equipment uncovers new possibilities in the study of a number of vital problems connected with the research and composition of the primary spectrum of cosmic rays, cosmic-ray variations, and the ori-

Card 2/3

ACCESSION NR: AT3012814

gin of cosmic rays and interactions between high energy particles and matter. "The authors are deeply grateful to G. B. Khristiansen for guidance in the work." Orig. art. has: 9 figures and 2 formulas.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 22Oct63

ENCL: 00

SUB CODE: PH, AS

NO REF SOV: 037

OTHER: 036

Card 3/3

ACCESSION NR: AT3012815

S/2961/63/000/005/0219/0223

AUTHORS: Abrosimov, A. T.; Blokh, Ya. L.

TITLE: Operating stability of photomultipliers in scintillation counters

SOURCE: AN SSSR. Mezhdudedomst. geofizich. komitet. 7 razdel program. MGG: Kosmicheskiye luchy. Sb. statey, no. 5, 1963, 219-223

TOPIC TAGS: photomultiplier, photoelectronic multiplier, scintillation counter, operating stability, cosmic rays, primary cosmic ray component, focusing electrode photomultiplier

ABSTRACT: The equipment tested is intended for continuous registration of the primary cosmic ray component. Several Soviet-made photomultipliers were tested and the results compared. The suitability of the different photomultipliers for different operating conditions is evaluated. It is shown that the most stable photo-

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ACCESSION NR: AT3012815

multipliers are those with focusing electrodes. "The authors are deeply grateful to G. B. Khristiansen for guidance of the work, to G. B. Bogoslovskiy and V. N. Aleksandrov for help with the experiments, and to I. Khrest'yaninov for help with the reduction of the experimental data. Orig. art. has: 3 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 22Oct63

ENCL: 01

SUB CODE: PH, AS

NO REF SOV: 010

OTHER: 002

Card 2/32

BLOKH, Ya.L.; BONDARENKO, V.M.; TARKHOV, A.G.

Underground recording of cosmic radiation to help in solving certain geological problems. *Geolog. i aer. 3 no.2:390-392* Mr-Apr '63. (MIRA 17:2)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya radiovoln AN SSSR i Moskovskiy geologorazvedochnyy institut imeni S. Ordzhonikidze.

BLOKH, G.M.; BLOKH, Ya.L.; DORMAN, L.I.

Some results of calculations of the expected spectrum of variations in a dynamic model of the Forbush effect. Izv. AN SSSR, Ser. fiz. 28 no.12:1985-1988 D '64 (MIRA 18:1)

BLOKH. Ya.L.; BONDARENKO, V.M.

Cosmic rays and geology. Priroda 53 no.9:85-89 '64.
(MIRA 17:10)

1. Institut zemnogo magnetizma, ionosfery i rasprostraneniya
radiovoln AN SSSR, Moskva (for Blokh). 2. Moskovskiy
geologorazvedochnyy institut im. S. Ordzhonikidze, Moskva
(for Bondarenko).

L 4511-66 EWT(1)/EWT(m)/FOC/T/EWA(h) IJP(c) GS/GW

ACCESSION NR: AT5022837

UR/0000/65/000/000/0257/0266

AUTHOR: Abrosimov, A. T.; Blokh, Ya. L.

TITLE: The study of short-period variations and microvariations of cosmic ray intensity using single scintillation counters

SOURCE: Vsesoyuznoye soveshchaniye po kosmofizicheskomu napravleniyu issledovaniy kosmicheskikh luchey, 1st, Yakutsk, 1962. Kosmicheskiye luchy i problemy kosmofiziki (Cosmic rays and problems in cosmophysics); trudy soveshchaniya. Novosibirsk, Redizdat Sib. otd. AN SSSR, 1965, 257-266

TOPIC TAGS: cosmic ray intensity, cosmic radiation composition, scintillation counter

ABSTRACT: Prior to the IGY all cosmic ray intensity variations were classified into two groups only: the long range (a few years or more) and the short range group. Recent investigations uncovered a considerable amount of fine structure in the short range group. On the basis of 41 references, the authors survey this new field, define the so-called microvariations, outline the methodology for the study of short-period and microvariations, discuss the demands imposed on photoelectric multipliers, describe devices for the study of the stability of operation of photoelectric multipliers, summarize the results of such studies, discuss the stabilization of the operation of complete scintillation counters, and stress the need for the development of new devices for the study of cosmic ray variations.
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L 4511-66

ACCESSION NR: AT5022837

2

Orig. art. has: 1 formula and 2 figures.

ASSOCIATION: Institut zemnogo magnetizma ionosfery i rasprostraneniya radiovoln AN
SSSR (Institute of Terrestrial Magnetism, the Ionosphere, and Radio Wave Propagation, AN
SSSR); Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific-Research Institute
of Nuclear Physics, MGU)

SUBMITTED: 29Oct64

ENCL: 00

SUB CODE: AA, OP

NO REF SOV: 026

OTHER: 015

CC

Card 2/2

L 2991266 FSS-2/EWT(1)/FE(v)-3/FCC/EWA(d)/EWA(h) TT/GS/GW

ACCESSION NR: AT5023633

UR/0000/65/000/000/0514/0528

AUTHOR: Blokh, Ya. L.; Dorman, L. I.; Kurnosova, L. V.; Logachev, V. I.; Platonov, G. F.; Razorenkov, L. A.; Sinitsina, V. G.; Sualov, A. A.; Fradkin, M. I. 76
B+1

TITLE: Some results of the study of cosmic ray nucleons by the Elektron-2 satellite

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 514-528

TOPIC TAGS: satellite, radiation, cosmic ray, cosmic radiation, nuclear particle, nucleon/Elektron 2 satellite

ABSTRACT: Included in the instrumentation of the Elektron-2¹² satellite (launched, Jan 1964; apogee, 68,000 km) was a combination of internal and external counters designed to register nuclear components of primary cosmic radiation. The design and calibration of this apparatus is described, and some results of partially-reduced data are discussed. / One counter¹² mounted on the external surface of the satellite was a combination of the Cerenkov and scintillation types which responded to nucleons in the atomic number range of $2 < Z < 30$. The internal counter was a Cerenkov

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L 2991-66

ACCESSION NR: AT5023633

type, registering at the discrete levels of $Z \geq 2$, $Z \geq 5$, and $Z \geq 15$. All counters were shielded and were designed to register only particles with energies ≥ 600 Mev/nuc. Fig. 1 of the Enclosure gives the basic schematic of the external counter combination. The authors detail the method used to calibrate the photomultiplier outputs in terms of the Z-range of input excitation; for example, for the type FEU-35 external counter, the anode output characteristic corresponded to the range from $Z = 4$ to $Z = 21$, and the output of the 7th dynode, to the range $Z = 6$ to $Z = 28$. The calibration technique was to excite a SiC electroluminescent diode with a high-voltage, short-duration (4—30 nsec) thyatron pulse, providing the phototube with a light input similar to a counter input. Early results from these primary particle counters, obtained during the IQSY, have been a useful supplement to analogous satellite data from the 1959-1962 period, during which solar activity was undergoing the transition from maximum to minimum. Comparative results are seen in Fig. 2, which shows an almost twofold increase in nuclear particles recorded near the solar activity minimum. Table 1 compares data from one orbit of Elektron-2 to that of the 1959 and 1960 satellites and the 1962 Mars-1 probe. To date only data for the $Z \geq 15$ particles have been reduced enough for statistical analysis. A large increase in incidence of this size particle was noted during solar eruptions observed in the course of the Elektron-2 flight. Orig. art. has: 18 figures, 1 table, and 1 formula. [S]

ASSOCIATION: none

Card 2/6

L 2991-66

ACCESSION NR: AT5023633

SUBMITTED: 02Sep65

ENCL: 03

SUB CODE: AA, NP

NO REF SOV: 003

OTHER: 000

ATD PRESS: 4/09

Card 3/6

L 2991-66

ACCESSION NR: AT5023633

ENCLOSURE: 01

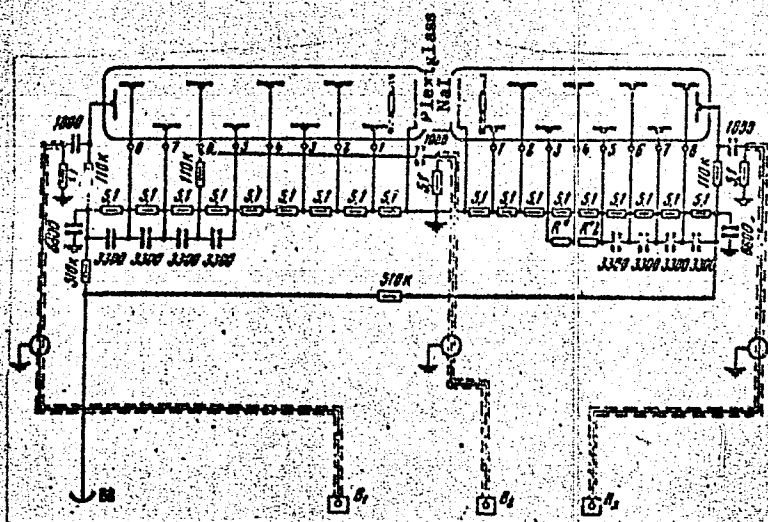


Fig. 1. External counter

B_1, B_2 - Phototube output from Cerenkov counter;
 B_3 - from scintillation counter.

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L 2991-66

ACCESSION NR: AT5023633

ENCLOSURE: 02

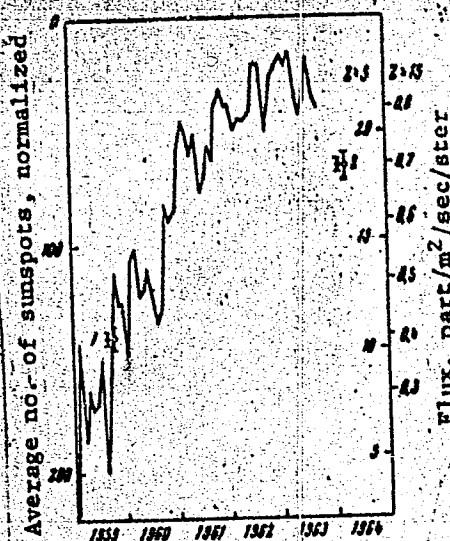


Fig. 2. Sunspot activity vs nuclear flux

Solid circles - $Z > 5$; open circles - $Z > 15$; 1 - Lunik-2;
2 - Elektron-2.

Card 5/6

L 2991-66

ACCESSION NR: AT5023633

ENCLOSURE: 03

Vehicles	Nuclear flux, particles/m ² /sec/ster		
	Z > 2	Z > 5	Z > 15
Elektron-2	343,4 ± 1,4	18,3 ± 0,3	0,60 ± 0,08
Lunik-2	150,6 ± 1,3	10,6 ± 0,3	0,4 ± 0,05
Korabl-3	120,2 ± 12,9	9,8 ± 0,7	—
Mars-1	333 ± 21	—	—

Card 6/6 *md*

L 4490-66 EWT(1)/EWT(m)/FCC/T/EWA(h)		LJPLC/ GH	
ACC NR: AP5024861		SOURCE CODE: UR/0048/65/029/009/1781/1783	
AUTHOR: Blokh, Ya.L.; Dorman, L.I.; Inozemtseva, O.I.; Leonov, V.Kh.; Nazaryuk, Ye.A.			
ORG: none			
TITLE: Counter telescope for recording the total cosmic ray flux with enhanced statistics /Report, All-Union Conference on Cosmic Ray Physics held at Apatity 24-31 August 1964/			
SOURCE: AN SSSR, Izvestiya. Seriya fizicheskaya, v. 29, no. 9, 1965, 1781-1783			
TOPIC TAGS: particle counter, cosmic ray telescope, cosmic ray measurement, cosmic ray anisotropy			
ABSTRACT: The authors discuss the design of a crossed counter telescope for recording the total cosmic ray flux. A design goal was to achieve a statistical accuracy of 0.1 % in 2 hours of counting. Design calculations for 25 different geometries were performed by a generalization of the method previously given by Ya.L.Blokh (Sb. "Kosmicheskiye luchy", No.3, ser. Rezul'taty MGG, str. 80. Izd. AN SSSR, 1961) for calculating directional curves for cubic geometry. The instrument was designed without lead to simplify the construction and to permit recording of the electron component, which is most sensitive to anisotropy effects. The final design consists of 16 identical 60 x 60 x 90 cm ³ elements containing 10 counters each and arranged with a 10 cm spacing between elements in a 270 x 270 x 90 cm ³ rectangular parallelepiped with the			
Cord 1/2			

L 3493-65

ACC NR: AP5024661

square faces horizontal. Counts are to be recorded in five principal directions (north, south, east, west, and vertical) and in four supplementary diagonal directions. The half-width of the directional diagram is 24° , the effective zenith angle is 33° , and the acceptance angle is 0.3 sterad. The sensitive area is approximately 4 m^2 in each direction, and a statistical accuracy of 0.14 % is anticipated for a 2 hour run. Correction will be made for changes in the accidental coincidence rate due to changes in the cosmic ray flux. Orig. art. has: 2 figures.

SUB CODE: NP/ SUBM DATE: 00/ ORIG REF: 004/ OTH REF: 002

66

Card 2/2

L 16026-66

ACC NR: AT6003531

EW(1)/EW(m)/FCO/EWA(h)

GW

SOURCE CODE: UR/3184/65/000/007/0240/0250

AUTHOR: Abrosimov, A. T.; Blokh, Ya. L.

ORG: none

TITLE: Use of scintillation counters in cosmic ray detectors

SOURCE: AN SSSR. Mezhdudomstvennyy geofizicheskiy komitet. Kosmicheskiye luchy,
no. 7, 1965, 240-250

TOPIC TAGS: scintillation counter, scintillator, cosmic ray, particle detector

ABSTRACT: In a brief survey of the literature, the authors consider various problems associated with the use of scintillation counters in cosmic ray detection equipment. Counters are discussed with respect to design characteristics, materials used and purpose. The methods used for collecting the light emitted during scintillations onto the photomultiplier cathode are divided into two categories: those using light guides, and those in which a portion of the light falls directly on the photomultiplier from an auxiliary space filled with scattered and reflected light. The amplitude characteristics of various counters are analyzed. Several experiments are

Card 1/2

L 16019-66 EWT(1)/FCC/EWA(h) GW

ACC NR: AT6003532

SOURCE CODE: UR/3184/65/000/007/0251/0259

AUTHOR: Abrosimov, A. T.; Blokh, Ya. L.

ORG: none

TITLE: Using new instruments to study short periodic variations and microfluctuations in the intensity of cosmic rays

SOURCE: AN SSSR. Mezhdunarodstvennyy geofizicheskiy komitet. Kosmicheskiye luchi, no. 7, 1965, 251-259

TOPIC TAGS: cosmic radiation, cosmic ray telescope, cosmic ray measurement

ABSTRACT: This paper is a review of the IGY and IQSY literature on short periodic variations and fluctuations in the intensity of cosmic rays measured in hours. These newly discovered phenomena are attributable mainly to the fine structure of the Forbush effect and to bursts of cosmic rays. It is pointed out that the investigation of these phenomena requires the use of supersensitive instruments (neutron monitors, cubic and azimuthal telescopes, underground telescopes and other detectors) for reliably recording various secondary components of cosmic rays. This

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L 16019-66

ACC NR: AT6003532

equipment may be used for studying microfluctuations with periods measured in minutes. The problems involved in using scintillation counters with photomultipliers for studying these phenomena are considered.

SUB CODE: 04, 18 SUBM DATE: 00/ ORIG REF: 021/ OTH REF: 018

Card 2/2

L 16021-66 EWT(1)/EWT(M)/FCC/EWA(h) GW
 ACC NR: AT6003533 SOURCE CODE: UR/3184/65/000/007/0260/0279

AUTHOR: Abramov, A. T.; Blokh, Ya. L.; Pomanskiy, A. A.

ORG: none

TITLE: Liquid scintillation detectors with large dimensions

SOURCE: AN SSSR. Mezhdunarodnyy geofizicheskiy komitet. Kosmicheskiye luchy,
 no. 7, 1965, 260-279

TOPIC TAGS: scintillation detector, scintillator

ABSTRACT: The authors point out the various advantages of liquid scintillators over crystals, gases and plastics for measurements in nuclear physics. One of the unique features of liquid scintillators is the fact that their shape is determined by that of the container. The dimensions of liquid scintillation counters may be made as large as several cubic meters. The limiting factor with respect to size is the mean free path of the scintillation light. The literature is briefly reviewed on the properties of primary and secondary soluble scintillators. Applications for various promising solvents in scintillation solutions are discussed. The factors affecting

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L 16021-66

ACC NR: AT6003533

the efficiency of liquid scintillators are analyzed and prospects for developing truly gigantic scintillation counters are considered.

SUB CODE: 18 SUBM DATE: 00/ ORIG REF: 001/ OTH REF: 061

Card 2/2

BLOKH, Ya.L.; BONDARENKO, V.M.; KOVALENKO, N.D.; TARKHOV, A.G.

Use of cosmic radiation for the purposes of underground
geophysical prospecting. Prikl. geofiz. no.38:142-157 '64.
(MIRA 18:11)

ACC NR: AP7000517

SOURCE CODE: UR/0048/66/030/011/1755/1759

AUTHOR: Blokh, Ya. L.; Dorman, L. I.; Kurnosova, L. V.; Razorenov, L. A.; Raychenko, L. V.; Suslov, A. A.; Fradkin, M. I.

ORG: none

TITLE: A study of time changes of nuclear flux in primary cosmic radiation on Elektron-2 and Elektron-4 satellites /Paper presented at All-Union Conference on Physics of Cosmic Rays held in Moscow from 15 to 20 November 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1755-1759

TOPIC TAGS: primary cosmic ray, cosmic ray measurement, cosmic ray intensity, *meteorologic satellite, nuclear flux, neutron flux*

ABSTRACT: Some results of a study of primary cosmic radiation conducted using the Elektron-2 and Elektron-4 satellites are given. An integral Cherenkov counter was placed in each satellite to measure fluxes of nuclei with energies greater than 600 Mev/nucleon. Those nuclei belonging to groups $Z \geq 2$, $Z \geq 5$, $Z \geq 15$ were measured by the Elektron-2, and those of group $Z > 20$ by the Elektron-4. Average flux values measured for the above groups of nuclei relative to the average flux values obtained during July 1964 are given in Fig. 1. The above data covers the period from 30 Jan 1964 through 9 Feb 1965. The fluxes

Card 1/3

ACC NR: AP7000517

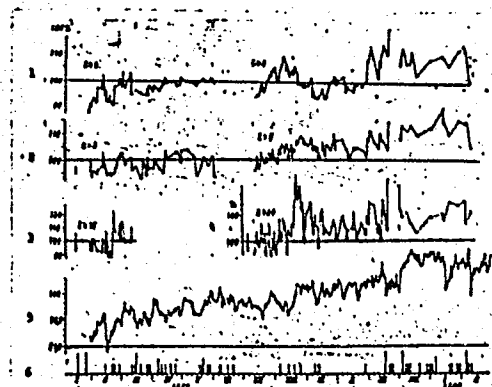


Fig. 1. Relative values of primary cosmic ray flux obtained by Elektron-2 and Elektron-4 satellites and by a ground station

1, 2, 3, 4 - Relative fluxes of nuclei with $Z \geq 2$, $Z \geq 5$, $Z \geq 15$ (right-hand graph) and magnitudes of statistical error of the mid-day values; 5, 6 - cosmic flux values obtained by the neutron monitor, and flux caused by chromospheric flares (the sizes of vertical lines correspond to flares of particles 1, 1+, and 2) registered at the Climax ground station.

Card 2/3

ACC NR: AP7000517

measured at midday by the satellites are in close correlation with those measured by the ground stations for quiet ground conditions. It is noted that nuclear flux increased by a factor of 1.7—2 during the period from 1959 to 1964. During the same period the flux registered by a neutron monitor at the Climax ground station increased by about 20%. During 1964—1965 as was anticipated the nuclear flux increased by about 15% for nuclei with $Z \geq 2$ and $Z \geq 5$. The accuracy of measurements of the flux increase of nuclei with $Z > 20$ during the flight of the Elektron-4 satellite was impaired by several rises in flux and by significant statistical errors. Orig. art. has: 3 figures.

[WA-75]
[IV]SUB CODE: 04, 1890/ SUBM DATE: none/ ORIG REF: 007/
OTH REF: 007

Card 3/3

BLOKH, Z. I. CAPT

PA 18/49T76

USSR/Medicine - Penicillin May/Jun 48
Medicine - Gonorrhea, Therapy

"Criterion of Recovery Following Penicillin
Therapy," Maj P. I. Golemba, Med Sv, Capt Z. I.
Blokh, Med Sv, 1 1/2 pp

"Vest Venerol i Dermatol" No 3

Discovery of intracellular gonococci on the day
after completion of penicillin therapy, especially
in those with favorable clinical report, does
not indicate therapeutic failure. In some cases,
those gonococci which had been once observed
disappeared without further treatment. Results

18/49T76

USSR/Medicine - Penicillin (Contd) May/Jun 48

of penicillin therapy can be judged only by repeated
microscopic examinations.

18/49T76

600

BLOKH, Z. Sh.

~~BLOKH, Z. Sh.~~

1. BLOKH, Z. Sh.

2. USSR (600)

"Synthesis of Four-Link Mechanisms," Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 1, 1940.
Institute of Machine Studies Academy of Sciences.

9. ~~Report~~ Report U-1530, 25 Oct 1951

BLOKH, Z. Sh.

BLOKH428SH0

600

1. BLOKH, Z. Sh.

2. USSR (600)

"Application of Connecting Rod Curves in the Solution of Problems of the Synthesis of Plane Mechanisms," Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 7, 1940.
Institute of Machine Studies, Academy of Sciences USSR. Submitted 8 February 1940.

9. ~~U-1530~~ Report U-1530, 25 Oct 1951.

BLOKH, Z. Sh.

"On the Theory of Conchoidal Mechanisms," Iz. Ak. Nauk SSSR, Otdel. Tekh.
Nauk, No. 4, 1941 Submitted 13 Feb 1941

U-1530, 25 Oct 1951

BLOKH, Z. Sh.

"Synthesis of Crank-Gear, Rectilinearly-Guided Mechanisms," Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 5, 1941. Submitted 27 Feb 1941

U-1530, 25 Oct 1951

BLOKH, Z. Sh.

"Chebyshev Theory of Symmetrical Mechanisms and Their Modifications,"
Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 6, 1941.
Submitted 13 Feb 1941.

U-1530, 25 Oct 1951

BLOKH, Z. Sh.

"Synthesis of Mechanisms with Stops,"

Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 7-8, 1941.

Submitted 27 Feb. 1941

BLOKH, Z.SH. and E. B. KARPIN

Prakticheskie metody sinteza ploskikh chetyrekhzvennykh mekhanizmov
(primeneniye metoda nomogramm) Moskva, AN SSSR, 1943. 170 p. diagrs.

Bibliography: p. 172.

Practical synthesis of plane four-link mechanisms (adaption of nomographs).

DLC: TJ175.B55

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library
of Congress, 1953.

BLOKH, Z. Sh.

"Concerning Chebyshev's Theory of a Lambda-Shaped Mechanism,"
Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 9, 1944.

BLOKH, Z. Sh.

"Concerning the Most-Advantageous Dimensions of a Chebyshev-Evans-Type Mechanism"
Iz. Ak. Nauk. SSSR. Otdel. Tekh. Nauk. No. 12, 1944

Bloch, Z. S. On the theory of the λ -shaped mechanisms of
Chebyshev. *Izv. Akad. Nauk SSSR Tekhn. Mekh.* 1964, No. 1, p. 11.

Izv. Akad. Nauk SSSR Tekhn. Mekh. 1964, No. 1, p. 11.

Izv. Akad. Nauk SSSR Tekhn. Mekh.

mechanisms of the Chebyshev type. *Izv. Akad. Nauk SSSR Tekhn. Mekh.* 1964, No. 1, p. 11.

On the theory of the λ -shaped mechanisms of
Chebyshev. *Izv. Akad. Nauk SSSR Tekhn. Mekh.* 1964, No. 1, p. 11.

Izv. Akad. Nauk SSSR Tekhn. Mekh.

Izv. Akad. Nauk SSSR Tekhn. Mekh.

1520A11, 2-134

Bloh, Z. Š. On the development of approximate methods
of synthesis of plane mechanisms R. 1. 1. 1.

author does not discuss, or even mention, the
author who has called $\beta \approx \theta \approx 4$ as a result of

... and the next reviews, ...

PA 50126

USAR/Engineering
Regulators
Synchronous Machines

Nov/Dec 1947

"Graphoanalytical Method of Evaluating the Dependability of Linear Regulatory Systems," Z. Sh. Blokh, 94 pp

"Avtomatika i Telemekh" Vol VII, No 6

Presents criterion for the sensitivity of linear regulatory systems, based on direct observation of corresponding characteristic equations as function of complex variable equation. Describes general graphic method of making characteristic curves with the aid of triangular coefficient of the characteristic

to

USAR/Engineering (Contd)

Nov/Dec 1947

equations. Discusses process of constructing and analyzing the dependability of linear regulatory systems that also permits study of the effect on the dependability of each of the coefficients of the characteristic equation individually. Exposition can be represented numerically by construction of characteristic curve to the seventh degree for the linear regulatory systems.

to

50126

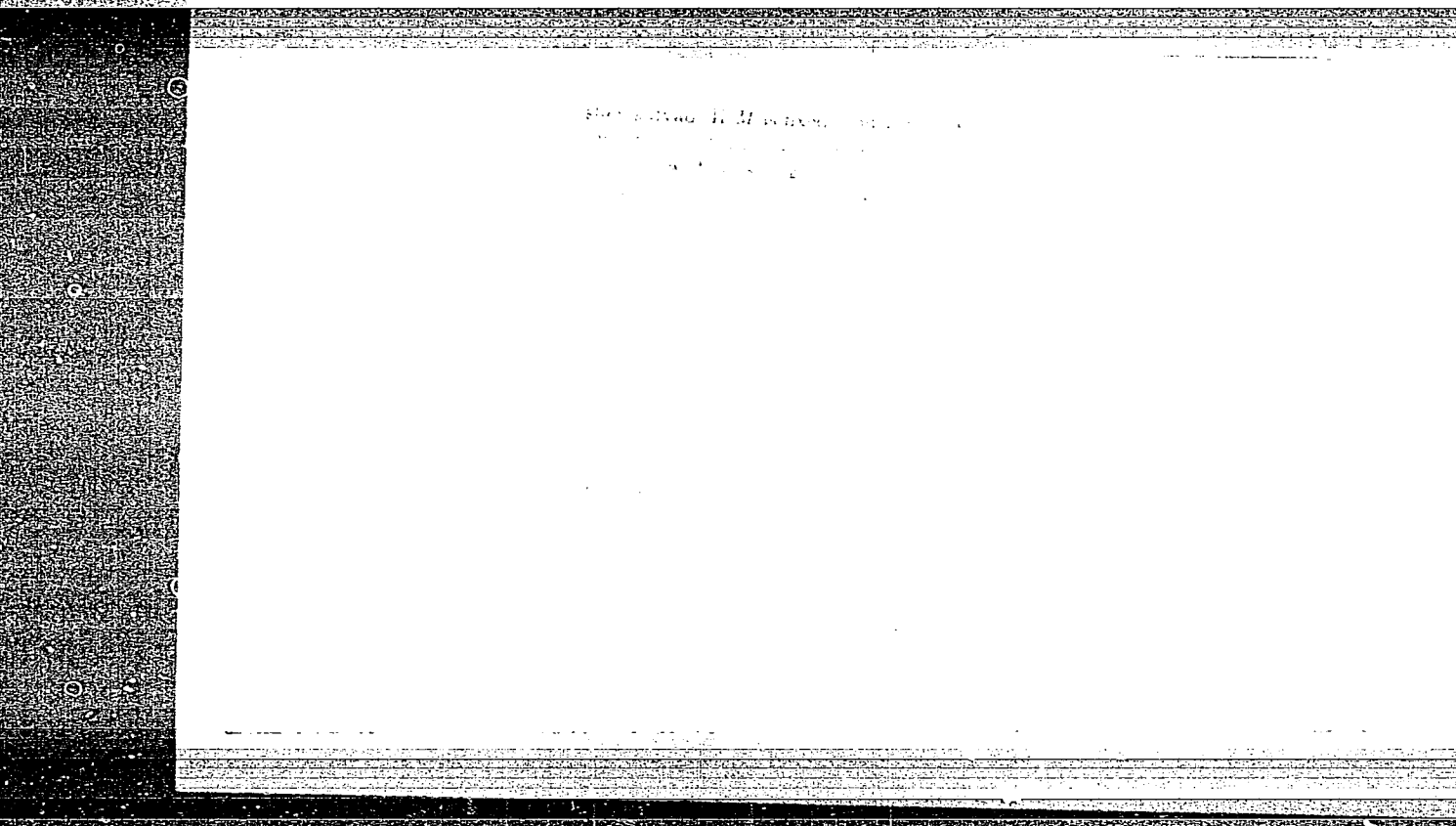
14 Bloh, Z. S. Priblizheniya sistem mekhanizmov. Approximate Mechanism Design. Approx.

Source: Mathematical Review. If also noted

The problems are arranged according to type of guidance
and deviation measure. First, straight-line tracking.

"APPROVED FOR RELEASE: 08/22/2000

CIA-RDP86-00513R000205530006-0



APPROVED FOR RELEASE: 08/22/2000

CIA-RDP86-00513R000205530006-0"

BLOKH, Z. SH.

PA 22/49130

USSR/Electronics

Jan 49

Regulators, Electronic
Linear Systems -- Analysis

"Aperiodic Stability of Linear Systems," Z. Sh.
Blok, 5 pp

"Avtomat 1 Telemekh" No 1

Examines graphic method of investigating
aperiodic stability of linear regulating sys-
tems, based on construction of characteristic
curves (see 50726) by means of polygon of co-
efficients. Shows that a single graphic proce-
dure exists suitable for analysis of regulated

22/49130

USSR/Electronics (Contd)

Jan 49

systems. Illustrated by numerical example.

Submitted 7 Apr 48.

22/49130

AYZERMAN, M.A.; KALISH, G.G., prof., doktor tekhn.nauk, laureat Stalinskoy
premi, retsenzent; FEL'DBAUM, A.A., kand.tekhn.nauk, retsenzent;
BLOKH, Z.Sh., prof., doktor tekhn.nauk, red.; SOKOLOV, T.F.,
tekhn.red.

[Introduction in the dynamics of the automatic control of engines]
Vvedenie v dinamiku avtomaticheskogo regulirovaniya dvigatelei.
Moskva, Gos.nauchno-tekhn.isd-vo mashinostroit.lit-ry, 1950.
150 p. (MIRA 14:4)

(Automatic control)

(Engines)

BLOKH, Z. Sh.

~~BLAKH, Z. Sh.~~

PHASE I

TREASURE ISLAND BIBLIOGRAPHICAL REPORT

AID 181 - I

BOOK

Call No.: TJ1055.B6

Author: BLOKH, Z. SH.

Full Title: MACHINE REGULATION

Transliterated Title: Regulirovaniye mashin

Publishing Data

Originating Agency: None

Publishing House: State Publishing House of Technical Theoretical Literature

Date: 1950

No. pp.: 360

No. of copies: 4,000

Editorial Staff

Editor: Levantovsky, V. I.

Tech. Ed.: None

Editor-in-Chief: None

Appraiser: None

Text Data

Coverage: The book contains theories of mechanisms and machines applicable to automatic control of various mechanical installations, including production lines, power units, turbines, aviation motors, etc. Criteria of stable, a- periodically stable, unstable, monotonous and other systems of regulation are presented along with the analytical analysis for the quality of regulation. (Sketches, diagrams, and charts).

This is the early edition of the book (1950). The second revised and supplemented edition was published in 1953 under the title Dinamika lineynykh sistem avtomaticheskogo regulirovaniya mashin.

Regulirovaniye mashin

AID 181 - I

Purpose: A textbook for engineers and post-graduate students of scientific research institutes and for the students of the Moscow Institute of Mechanics, Division of Theory of Mechanisms and Machines.

Facilities: Thanks are expressed to co-workers at the Moscow Institute of Mechanics: T. T. Belousova, Ye. R. Vanchinova, A. M. Rubinchik, M. I. Freydlin and Yu. V. Dolgolenko.

No. of Russian and Slavic References: 46 (1930-1950)

Available: Library of Congress.

2/2

BLOKH, Z. Sh.

BLOKH, Z. Sh.

600

1. BLOKH, Z. Sh.

2. USSR (600)

"Designing Four Link Mechanisms According to the Limit Value of Acceleration of the Working Link," Iz. Ak. Nauk SSSR, Otdel. Tekh. Nauk, No. 8, 1950.
Institute of Machine Studies, Academy of Sciences USSR. Submitted 28 Nov 1939.
49?

9. Report U-1530, 25 Oct 1951

BLOKH, Z.Sh

PHASE I

TREASURE ISLAND BIBLIOGRAPHIC REPORT

AID 179 - I

BOOK

Call No.: TJ254.B55

Author: ~~BLOKH, Z. Sh.~~

Full Title: DYNAMICS OF LINEAR SYSTEMS OF AUTOMATIC CONTROL OF MACHINES

Transliterated Title: Dinamika lineynykh sistem avtomaticheskogo regulirovaniya mashin

Publishing Data

Originating Agency: None

Publishing House: State Publishing House of Technical Theoretical Literature

Date: 1952

No. pp.: 492

No. of copies: 10,000

Editorial Staff

Editor: Rubinchik, A. M.

Editor-in-Chief: None

Tech. Ed.: None

Appriaser: None

Text Data

Coverage: The book represents a revised and considerably supplemented edition of the book Regulirovaniye mashin (1950) by the same author. This edition contains basically the same material as the first. Theories of mechanisms and machines applicable to automatic control of various mechanical installations, including production lines, power units, turbines and aviation motors are given. Criteria of stable, a- periodically stable, unstable, monotonous and other systems of regulation are presented along with the analytical analysis of the quality of regulation. The supplemental chapters are related to the separation of regions of stability

1/2

Dinamika lineynykh sistem avtomaticheskogo regulirovaniya mashin AID 179 - I

on number of parameters, the discussion of transient processes and their evaluation, and the frequency method of analysis of regulation quality. (Sketches, diagrams, and charts).

The book may be of interest to workers on the problems of automatic control.

Purpose: Textbook for engineers and post-graduate students of scientific research institutions and for the students of the Moscow Institute of Mechanics, Division of Theory of Mechanisms and Machines.

Facilities: Authors of works on this and related subjects are mentioned, beginning with Chebyshev and Vishnegradskiy up to recent authors such as Solodovnikov, Tsipkin, and others. (List given on p. 488).

No. of Russian and Slavic References: 65 (1938-1950).

Available: Library of Congress.

2/2

BLOKH. Z. Sh.

~~BLOKH, Z. Sh.~~

Analysis of control quality in single-circuit systems. Sbor.nauch.
rab. Mekh.inst. no.3:147-156 '52. (MLRA 8:3)
(Electric circuits) (Automatic control)

BLOKH, I.S.

BLOKH, I.S.

Control time determination. Sbor.nauch.rab. Mekh.inst. no.3:157-166
'52. (MLRA 8:3)

(Electric controllers)

BLOKH, Z.Sh.

More precision in the determination of monotony limits in transition processes. Sbor.nauch.rab. Mekh.inst. no.3:167-177 '52. (MLRA 8:3)
(Automatic control)

BLOKH, Z.Sh.

Letter to the editor of the periodical "Avtomatika i Telemekhanika."
Avtom. i telem. 14 no.1:107-109 Ja-F '53. (MLRA 10:3)
(Automatic control)

BLOKH, Z.Sh., doktor tekhnicheskikh nauk, professor, redaktor; FEL'D-
BAUM, A.A., doktor tekhnicheskikh nauk, retsenzent; POPOVA, S.M.,
tekhnicheskiy redaktor.

[Calculations and analysis of automatic control systems for
machinery collected scientific works] Raschet i analiz sistem
avtomaticheskogo regulirovaniia mashin; sbornik nauchnykh rabot.
Pod red. Z.Sh.Blekh. Moskva, Gos. nauchno-tekhn. izd-vo mashino-
stroitel'noi lit-ry, Vol. 7. 1954. 174 p. (MLRA 8:2)

1. Moscow. Moskovskiy inzhenerno-fizicheskiy institut.
(Automatic control)

BLOKH, Z.Sh., doktor tekhnicheskikh nauk, professor.

Analysis of overregulation and regulation time in linear
systems. Sbor.nauch.rab.MIFI no.7:64-79 '54. (MLRA 10:2)

(Servomechanisms)

BLOKH, Z.Sh., doktor tekhnicheskikh nauk, professor.

Overregulation following a load drop and returning of the
regulator. Sbor.nauch.rab, MIFI no.7:80-86 '54. (MLRA 10:2)

(Servomechanisms)

BLOKH, Z.Sh., doktor tekhnicheskikh nauk, professor.

Some problems in calculating regulator parameters. Sbor.nauch.
rab. MIFI no.7:87-97 '54. (MLRA 10:2)

(Servomechanisms)

BLOKH, Z.Sh., doktor tekhnicheskikh nauk, professor.

Integral equations used in the theory of regulation. Sbor.
nauch.rab. MIFI no.7:98-104 '54. (MLRA 10:2)

(Automatic control) (Integral equations)

1985, Block 7. The calculation of governing parameters
from given control conditions (in Russian). Trans.
Conference on the Theory of Control Systems.

1970, May 7-10. The calculation of governing parameters
from given control conditions (in Russian). Trans.
Conference on the Theory of Control Systems.

BLOKH, Z. Sh.

Bloh, Z. S. Some estimates of the quality of regulation from the frequency characteristics. Avtomat. i Tele. mek. 15 (1955), 258-268. (Russian)

1 - F/7

Estimates for quantities that measure the quality of regulation of linear servo systems are obtained from known formulas which relate the performance of the system to the transfer function $\Phi(i\omega)$; $\Re(\omega)$ and $\Im(\omega)$ are defined to be the real and imaginary parts, respectively, of $\Phi(i\omega)$. Let $\varphi(t)$ be the response of the system to a unit step function. The basic relations used are:

$$(1) \quad \Phi(z) = L(\varphi'(t)) = \int_0^{\infty} \varphi'(t) e^{-zt} dt,$$

$$(2) \quad \varphi(t) = \frac{2}{\pi} \int_0^{\infty} \frac{\Re(\omega)}{\omega} \sin \omega t dt,$$

$$(3) \quad \varphi(t) = 1 + \frac{2}{\pi} \int_0^{\infty} \frac{\Im(\omega)}{\omega} \cos \omega t dt,$$

where $\Phi(i\omega) = \Re(\omega) + i\Im(\omega)$. It is assumed that $\varphi(\infty) = 1$; i.e. the servo has a zero static error.

(over)

3. S. Bloh

3

Necessary conditions are given that $\varphi(t)$ be monotonic. It follows from (1) that (4) $M(\omega) = |\Phi(i\omega)| \leq \int_0^\infty |\varphi'(t)| dt$ and, if $\varphi(t)$ is monotonic, this estimate becomes $M(\omega) \leq 1$. It is also shown that $|S(\omega)| \leq |S(0)|$, where $S(\omega) = \mathfrak{I}(\omega)/\omega$, is a necessary condition that $\varphi(t)$ be monotonic. Estimates from below of the "over-regulation" of the system are obtained under the assumption that $\varphi(t)$ has a finite number of maxima and minima. For example, when φ has a single maximum, it follows from (4) that $\varphi_{\max} \geq \frac{1}{2}(1 + \max M(\omega))$. Under the assumption that $\Re(\omega)$ has a finite number of maxima and minima in the main frequency interval, estimates from above are ob-

2/2

tained on the "over-regulation". These estimates are used to obtain estimates on the time of regulation.

The application of some of these results are illustrated for a single-loop servo; $\Phi(i\omega) = w_0(i\omega)/(1 + w_0(i\omega))$. This is done by plotting the Nyquist diagram of the feedback transfer function. J. P. LaSalle (Notre Dame, Ind.).

Smw

BLOKH, Z.Sh. (Moskva)

Some properties of the frequency characteristics of automatic control systems. Izv.AN SSSR Otd. tekhn. nauk no.2:43-58 F '56.
(Automatic control) (Servomechanisms) (MLRA 9:7)

AUTHOR: Blokh, Zalman Shevelevich, Doctor of SOV/161-58-1-3/33
 Technical Sciences, Head of the Department of Technical
 Mechanics at the Central Institute for Correspondence Courses for
 Fisheries

TITLE: On a Necessary Attribute of Monotony (Ob odnom neobkhodimom
 priznake monotonnosti)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Elektromekhanika i avtomatika,
 1958, Nr 1, pp. 13 - 15 (USSR)

ABSTRACT: In this paper the necessary attribute of monotony for ordinary
 linear systems of automatic control with lumped parameters
 is formulated. This attribute is connected with the
 distribution of the zero-points and of poles in the velocity
 representation of a transient process. A transient process
 with zero initial conditions is given in a diagram, where
 $F_0(z)$ and $F_1(z)$ are polynomials which do not tend towards
 zero at 0. The necessary attribute of monotony will be the
 condition $F_0(z) > 0 \dots (8)$ for a wide range of $-z_1 \leq z \leq 0$ for
 real values of z . This condition (8) imposes more stringent

Card 1/2

On a Necessary Attribute of Monotony

SOV/ 161-58-1-3/33

conditions upon the distribution of zero-points and of poles in the velocity representation of a monotonous transient process, than is the case in reference 1. This new attribute of monotony is formulated as follows: It is necessary for a monotonous course of a transient process that all real zeros of the velocity function are within the domain limited by the vertical line $z = -z_1$, which represents its left boundary, when the assumption $\varphi(0) = 0$ is made. This attribute of monotony can easily be examined if the distribution of the poles in the picture of the transient process is not given. This is shown at an example. This method permits to determine the sufficient attribute for the oscillating of an arbitrary transient process by a procedure which does not differ from the analysis of stability. There is 1 reference, which is Soviet.

ASSOCIATION:

Kafedra tekhnicheskoy mekhaniki Tsentral'nogo
zaochnogo instituta rybnoy promyshlennosti (The
Chair of Technical Mechanics at the Central Institute for
Correspondence Courses for Fisheries)

Card 2/2

SUBMITTED: November 14, 1957

8(2)

AUTHOR:

Blokh, Zalman Shevelevich, Candidate of Technical Sciences, Professor at the Chair of Technical Mechanics of the Central Correspondence Institute of the Fishing Industry SOV/161-58-2-7/30

TITLE:

Integral Equations for Control Systems with Time Delay (Integral'nyye uravneniya dlya sistem regulirovaniya s zapazdyvaniyem)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Elektromekhanika i avtomatika, 1958, Nr 2, pp 54 - 58 (USSR)

ABSTRACT:

The representation of a transient in a linear control system with time delay is investigated in the form given in (1). The time functions $\varphi_0(t)$ and $\varphi_k(t)$ are assumed to be limited by the modulus for any finite time period $0 \leq t \leq t_{\text{given}}$. The integral equations method that has been investigated in this paper (Ref 2) and which is here transferred to time delay systems permits the elimination of the difficulties involved in the synthesis of a transient according to the representation of formula (1) (transcendental characteristic equation and

Card 1/2

Integral Equations for Control Systems With Time Delay SOV/161-58-2-7/30

infinite number of roots). The method permits the construction of a precise appropriate transient, for any given finite interval $0 \leq t \leq t_{\text{given}}$. At first, the integral equations of the transient are analyzed. The formula (3) is obtained for the wanted transient with delay. Formula (5) is then derived offering a solution of the integral equation (3) by a series. A time delay system is then investigated in the circuit of an additional feedback. The wanted transient corresponding to formula (7) is determined as the solution of the integral equation. A method for the synthesis of a transient in simpler systems is shown. There are 3 Soviet references.

ASSOCIATION: Kafedra tekhnicheskoy mekhaniki Tsentral'nogo zaochnogo instituta rybnoy promyshlennosti (Chair of Technical Mechanics of the Central Correspondence Institute of the Fishing Indust:

SUBMITTED: April 14, 1958

Card 2/2

28(1)

80V/161-58-4-8/28

AUTHOR:

Blokh, Zalman Shevelevich, Doctor of Technical Sciences,
Head of the Chair

TITLE:

Frequency Methods for Systems of a Regulation With Retardation
(Chastotnyye metody dlya sistem regulirovaniya s zapazdyvaniyem)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Elektromekhanika i
avtomatika, 1958, Nr 4, pp 50-58 (USSR)

ABSTRACT:

Frequency methods are investigated here for establishing transition processes and for the estimation of the regulating quality at systems with retardation. These methods represent a generalization of the analogous methods for ordinary systems without retardation. (Refs 2, 3). This paper was lectured at the obshchemoskovskiy seminar po teorii avtomaticheskogo regulirovaniya (All-Moscow Seminary About the Theory of Automatic Regulation) on March 12, 1958. The transition process $\varphi_3^*(t)$ for a linear regulation system is investigated in form of the equation (1). It is supposed that all poles of (1) are situated in the left semiplane with the exception of the possible simple pole in the origin of coordinates. Therefore it is of advantage to investigate instead of (1) the func-

Card 1/3

SOV/161-58-4-8/28

Frequency Methods for Systems of a Regulation With Retardation

tion of the complex variables $W_2(z)$, - formula (2) - and the temporal characteristic $\varphi_3(t)$ corresponding to it. This simplifies essentially the analysis of the corresponding frequency characteristics. The transition from $\varphi_3(t)$ to $\varphi_3^*(t)$ makes no difficulties. According to the paper (Ref 2) here the time function $\psi_3(t)$, - formula (5) as transition function is investigated instead of $\varphi_3(t)$. - Some properties of the frequency characteristics are investigated, and it is shown that in the present case the high frequency part of the characteristics can be neglected and that the error caused thereby may be estimated according to the formulas derived in the paper (Ref 3) for analogous characteristics of systems without retardation. In this way a frequency range is determined for systems with retardation by means of which the investigation of frequency characteristics of these systems may be limited. For the purpose of determining the influence of a retardation on the quality of the regulation process the integral estimation of the same system with and without consideration of the retardation is carried out. The results are compared with each other. - In the paper (Ref 5) several methods are given

Card 2/3

SOV/161-58-4-8/28

Frequency Methods for Systems of a Regulation With Retardation

for the approximation of the frequency characteristics for systems without retardation. Here the possibility of applying these methods for the analysis of the regulation quality at systems with retardation is illustrated by means of a concrete example. There are 2 figures and 8 Soviet references.

ASSOCIATION: Kafedra tekhnicheskoy mekhaniki Tsentral'nogo zaochnogo instituta rybnoy promyshlennosti
(Chair of Technical Mechanics at the Central Correspondence Institute of the Fish Industry)

SUBMITTED: April 4, 1958

Card 3/3

BLOKH, Z.Sh., prof., doktor tekhn. nauk

Calculating the overtravel and stabilization time from primary
parameters of frequency response characteristics. Nauch. trudy
MITI no.8:90-106 '58. (MIRA 13:3)
(Automatic control)

BLOKH, Z.Sh., prof., doktor tekhn. nauk

Evaluating the quality of automatic control. Nauch. trudy MITI
no.8:107-128 '58. (MIRA 13:3)

(Automatic control)

82917
S/144/60/000/006/002/004
E041/E121
9.3700
AUTHOR: Blokh, Z.Sh. (Doctor of Technical Sciences, Professor)
TITLE: Sufficient Criteria for Monotonicity of Transient Processes
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Elektromekhanika, 1960, No 6, pp 13-16

TEXT: The author has previously obtained sufficient criteria for certain typical initial conditions. In this paper such restrictions are absent. A stable transient process is described by Eq (1) where the time-function is Eq (3). The behaviour is monotonic if the time derivative satisfies the inequality in the next line. The necessary conditions for monotonicity deduced in earlier work (Refs 1 and 2) are assumed to be observed. Successive applications of the inequality of Eq (4) eliminates all the virtual poles from Eq (1) and simplifies the system to be considered. If the inequalities of Eq (5) also hold then if $\psi_{m-1}(t)$ is a monotonic decreasing function, so is $\psi_m(t)$. It is shown that the contrary possibility leads to an absurdity. An analogous conclusion may be arrived at for monotonic increasing functions.

Card 1/2

82917

S/144/60/000/006/002/004

E041/E121

Sufficient Criteria for Monotonicity of Transient Processes

In the earlier work (Ref 2) necessary and sufficient conditions for monotonicity have only been deduced for $n - s \leq 3$ (n, s defined in Eq (4)). This refers to Eq (1) when there are no more than two complex conjugate poles in the left-hand half-plane. The particular case is considered of an expression in which all the poles are real and negative and lie in the left-hand half-plane. The example of Eq (8) is shown to obey the rules deduced. The simplest application of the theorem is to the design of correcting networks for control systems.

There are 1 figure and 2 Soviet references.

ASSOCIATION: Kafedra tekhnicheskoy mekhaniki Vsesoyuznogo zaochnogo elektrotekhnicheskogo instituta svyazi

Card 2/2 (Department of Technical Mechanics, All-Union

Correspondence Electrotechnical Institute of
Communications)

SUBMITTED: February 10, 1960

S/103/60/021/06/04/016
B012/B054

AUTHOR: Blokh, Z. Sh. (Moscow)

TITLE: Transients in Control Systems⁹ With Delay

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21, No. 6,
pp. 710 - 719

TEXT: A method of building up the transient in control systems with delay is described. A simulator of a section of the control circuit with delay (Fig. 1) is investigated. $\hat{z}(z)$ is the transient function of the section without consideration of delay; θ is the time of delay which is assumed to be constant. Further, it is assumed that in plotting the curve of the function $\varphi_{\text{output}}(t)$ it is necessary to consider the initial function $\varphi_{\text{input}}^*(t)$ which is given in the range $-\theta \leq t \leq 0$. Formula (1) is written down, which shows that the influence of initial functions can be considered independently. Considering this circumstance, the function $W(z)$ of a transient in a closed linear control system with delay (Fig. 2) is studied in the form of equation (2). It is assumed that the functions

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Transients in Control Systems With Delay

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$\Phi_1(z)$ and $\Phi_2(z)$ must consider the delay in the additional feedback circuits in those cases where it is necessary. The author describes a method of building up a transient which is not connected with the investigation of the convergence of an infinite series. Formula (3) is directly obtained from formula (2); the convolution and delay theorems (Ref. 3) is applied to formula (3), and the integral equation (4) is obtained for the desired transient. The solution of this integral equation for $\varphi_{\text{output}}(t)$ is given in the form of a series that is

absolutely and regularly convergent with respect to any time interval. The frequency characteristics are investigated on the basis of function (10). It is shown that the frequency characteristics corresponding to this formula (10) usually have a finite number of points of intersection with the frequency axis, and do not considerably differ in their course from the analogous characteristics of systems without delay. For this reason, the author uses the same methods as had been worked out in the papers (Refs. 5-7). After the principal parameters of the real and imaginary frequency characteristics of delay systems, the author evaluates overcontrol and time of control. Formulas are derived on the

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AUTHOR: Blokh, Z.Sh.

TITLE: Approximate determination of over-control and control time from the parameters of the frequency characteristic

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1962, abstract 6-2-118 s (Tr. I Mezhdunar. kongressa Mezhdunar. federatsii po avtomat. upr., Toeriya nepreryvn. sistem, Spets. matem. probl., M., AN SSSR, 1962, 181-182)

TEXT: It is shown by the example of a third-order system with known real frequency characteristic, how over-regulation and regulation time can be found (by using this characteristic). To do this one selects, at first, the parameters needed for the subsequent calculations; they are determined from the values of the characteristic at the extremum point, at the point where the characteristic intersects the ω axis and at the $\omega = 0$ point. The formulas given enable one to determine the quantities sought on the basis of the

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parameters found. The method is also applicable to systems with
delay. 2 figures. [Abstractor's note: Complete translation.]

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PHASE I BOOK EXPLOITATION

SOV/5833

Blokh, Zalman Shevelevich

Perekhodnyye protsessy v lineynykh sistemakh avtomaticheskogo regulirovaniya
(Transient Processes in Automatic Control Linear Systems) Moscow, Fizmatgiz,
1961. 492 p. Errata slip inserted. 10,000 copies printed.

Ed.: A. M. Rubinchik; Tech. Ed.: I. Sh. Aksel'rod.

PURPOSE: This book is intended for control system specialists who are already acquainted with the basic concepts of modern control theory, the derivation of the differential equations of the elements, their linearization, and the investigation of systems with respect to stability.

COVERAGE: The book deals with transient processes in linear automatic continuous-motion control systems. The first chapter contains only material and formulas on the theory of Laplace and Fourier transforms which are used for the study of transient processes. The displacement theorem is represented in such a manner that in the study of systems with a lag, initial conditions different from zero could be taken into account. The second chapter presents methods for

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Transient Processes (Cont.)

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setting up transfer functions of complex control systems. Along with transfer functions with respect to control action, transfer functions with respect to disturbing action are considered, which correspond to transient processes for a break in the load. In considering the standard characteristics of individual elements it is shown how their physical parameters are determined (time constants and amplification factors) from experimentally obtained characteristics. The third chapter deals with the construction of transient processes on the basis of a given distribution of the zeros and poles of the transfer function. Attention is given to systems with multiple poles as a basis for accurate construction of transient processes in systems with lag. The fourth and fifth chapters contain formulas for calculating and estimating overshoot, control time, maximum velocities, and accelerations in systems of different degrees of complexity. The text is accompanied by a number of computational graphs which facilitate the practical use of the derived estimated formulas. The sixth chapter contains a number of results regarding the qualitative analysis of the character of the course of transient processes. Indications for the state of oscillation are given, and, for the first time, structurally nonmonotonic control systems, analogous to structurally unstable systems, are considered. In the seventh chapter, the conclusions and results obtained in chapters IV to VI, are used for selecting the parameters of series-connected and parallel correcting elements providing a given quality of the control process. Problems of guaranteeing a given static error, a given degree of stability and oscillatory conditions, and given upper

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Transient Processes (Cont.)

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limits for overshoot and control time are considered. In contrast to the formerly explained calculation method, the parameters of the correcting elements are determined by giving the distribution of only two (not of all) roots of the characteristic polynomial; besides, the method secures the previously given values of all the remaining (excepting the correcting) parameters of the standard elements of the control system under consideration. The eighth chapter discusses frequency methods of analysis and construction of transient processes in ordinary systems as well as in systems with lag. In the construction of transient processes particular attention is given to imaginary frequency characteristics; their use makes completely unnecessary the setting up of special tables of auxiliary functions, ordinarily required for constructing a transient process from essential characteristics. Attention is given to methods of natural frequency characteristics approximation, the use of which permits in extremely important cases estimating overshoot and control time without the very difficult calculations required for the construction of the frequency characteristics of closed systems. The author thanks Professor M. A. Ayzerman for valuable advice and G. M. Irlina and I. Z. Blokh for assistance with diagrams and calculations. Numerous references appear in footnotes to the text.

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L.Ye., red.

[Handbook for carrying-out tests in theoretical mechanics
for second year students of technical departments] Posobie
k vypolneniiu kontrol'nykh rabot po teoreticheskoi mekha-
nike dlia studentov II kursa tekhnicheskikh fakul'tetov.
Moskva, Redaktsionno-izdatel'skii otdel VZEIS, 1963. 139 p.
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(Abstracted by NOSKOV, A. I.)
"Treatment of goat scabies by means of a motor oil [Avtolovyi] liniment
and benzene hexachloride dust"...
Veterinariya, vol. 39, no. 3, March 1962 pp. 33

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Comparative evaluation of different collateral paths for the discharge of bile in an obstruction of noncancerous origin of the terminal section of the bile duct. Trudy KGMI no.10:379-382 '63. (MIRA 18:1)

1. Iz kafedry fakul'tetskoy khirurgii (zav. kafedroy zasluzhennyy deyatel' nauki RSFSR - prof. V.S.Semenov) Kalininskogo gosudarstvennogo meditsinskogo instituta.

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